ARCV
UPUB
A33.105
no.59

THE MARYLAND
AGRICULTURAL EXPERIMENT STATION
STATE HORTICULTURAL DEPARTMENT.

CIRCULAR BULLETIN No. 59. JUNE 1904.

Botany in the Public Schools and on the Farm.

PROF. J. B. S. NORTON.

There are many persons, young and old, who have a desire for increased knowledge, and have a natural taste for work in natural science but who cannot leave their work for a course at College. To such persons there may be no more delightful or instructive pursuit than study and observation at odd moments of the mineral, plant and animal objects found on the farm, or even on city lots, and their relations to one another. And there is no better way to develop the child's mind in a sane and healthful way than by such exercises reasonably directed. Many persons, while hindered by sickness, or otherwise, from doing harder work could make life enjoyable and useful by such pursuits indoors or outdoors. This committee can probably do no better work than to encourage such studies of the vegetable life of the farms, gardens and yards of the State. Moreover such work by individuals without technical training, may bring new ideas to the professional scientist, who, too often, gets into scholastic ruts.

Public school teachers could direct their pupils in such work, and some time is now being devoted to elementary natural science in many schools. If the pupil's attention could be attracted to roadside plants in coming and going from school, as well as in the meager time that can be devoted to that work in school hours, much will be gained. In such work the first thing to be borne in mind, by teachers as well as pupils, is that plants are living things which feed, respire, move, and in the most fundamental life relations, differ but little from animals. This attitude of mind makes them seem much more worthy of attention, although the supporting evidence of such a view is not so readily apparent as with animals without some investigation. And here I would say that the *little* things should not be neglected. The mosses, lichens, mushrooms, even the green water ecum, are as interesting, not to say beautiful, as larger plants like oaks and apple trees; the weeds on city lots and in back yards, offer material for almost every line of botanical work the city teacher

needs to take up, and the life processes going on and the variety of plant structures to be found under the snow or underground in winter, are only somewhat less varied, but more interesting because less known, than the above ground vegetation.

Several lines of observation of plants could be taken up. One of the first thought of would probably be a consideration of the *different kinds* of plants to be found on a farm, a city lot or close to a certain strip of road or if taken up by several persons, the flora, of a whole town, district or community. The names can be learned from the teacher, or other persons who may have some knowledge of them, or possibly from a manual. A more correct method would be to send specimens, of flowers, seed vessels and leaves of the unknown kinds to a professional botanist.

In connection with this work, a herbarium or collection of dried specimens could be made in which the plants observed could be preserved for comparison with others and arranged according to their resemblances. The young student would soon learn to pick out representatives of many of the natural families of plants like grasses, legumes, composites, etc. It is a very simple matter to make such a collection by pressing the specimens, which should consist of whole plants, if small enough, or at least contain all the characteristic parts, between several thicknesses of newspaper, which should be placed in a pile under a heavy weight, and changed daily until the plants are dry. With each specimen should be kept notes of all that is known about the plant, where it came from, when collected, the color of the flowers, its abundance or rarity, what kinds of plants grow with it, whether stock eat it or it is useful in any way, or a weed or poisonous; the kind of soil grown in, the insects found on it, or anything interesting in its structure or method of life.

This collection of plants or notes would furnish a basis for all other botanical observations and studies, and it is hard to do connected work of other kinds with plants, without some knowledge of the species and without some kind of names by which to designate them. Then, too, the acquiring of the names of the plants (common as well as Latin) finds a more proper place in the elementary schools than in the higher institutions, where botany is naturally concerned chiefly with the more important problems of morphology and physiology.

These two branches just mentioned should, by no means, be neglected in the work of which this report treats, since they are vitally connected with the practical operations of farm and garden. Many of the common life functions of our cultivated plants, and the structures and arrangements of roots, stems, wood, bark, leaves, flowers,

etc., for the performance of these functions can be delightfully unfolded to young minds by many simple observations or experiments; the planning of which to avoid possible sources of error in conclusions will give excellent mental training. Some of the advanced problems relating to the manner in which crops live and supply the products desired by man, are, of course, more complicated and their solution vastly more important than those of the higher mathematics taught for mental training in colleges and universities, but many are simple enough to interest the youngest. A few examples may be mentioned to begin with:

Can plants move? Watch a sunflower bud at intervals from morning to night. Observe the manner in which clover leaves close at night. Such observations will also indicate that plants are sensitive to light and other forces and conditions.

How do the leaves act? Test by removing one-half of the leaves from some potato plants, all from others, none from some. What difference in the potatoes produced? How can it be shown that this is not due to wounding or other cause rather than loss of leaves?

Does cold weather or moisture injure seed corn? Try by keeping some over winter in wet, cold, dry and warm places.

Cut a ring of bark off growing branches of different kinds of trees, each month, and note the effect next year, as compared with uninjured ones on the same tree.

Germinate some garden seeds of different kinds, between moist cloths or paper and watch the process of development and the new organs formed as well as the changes of those already in the seed.

An interesting and very valuable line of observation would be the study of the kinds of plants found on various parts of the farm, and the differences in soil composition, state of cultivation, water content, etc., which are found with the various associations of plants? The development of forests from cultivated land could be followed up for several years, noticing first the appearance of annual weeds, then perennial weeds and grasses followed by shrubs, next pines and cedars and these possibly followed by other trees springing up under the evergreens. Another good ecological problem would be an examination of different orchard varieties with reference to their power to set fruit without the help of insects. Considerable could be learned by tying bags of fine netting over the buds before they open, to prevent the access of insects, leaving them on until the flowers are gone.

A collection of notes on the local uses of wild plants would be

highly desirable. The following list shows a few uses of some Maryland plants. Almost anyone could add items to it.

Berries used as fruits: Wintergreen, 12 kinds of huckleberries, ground cherries, partridge berries, 2 kinds of elderberries, black haw, cranberry, hackberry, red and white mulberry, 2 kinds of gooseberries, 2 of currants, 3 of raspberries, 8 of blackberries, 5 of dewberries and 2 of strawberries.

Other fruits: Persimmon, pappaw, mayapple, wild crabapple, service berries, prickly pear, several red haws, 3 kinds of plums, 4 of wild cherries and 7 of grapes.

Nuts: Beech, hickory, chestnut, chinquapin, 12 kinds of acorns, walnut, butternut, water lily seeds, hazel and nut grass.

Fiber may be obtained from: Milk weed, wild flax, velvet plant, basswood, hemp; willows, leatherwood, hickory splits and various grasses and rushes used for wicker work might be classed here.

Useful as greens, salads, etc.: Pepper grass, shepherd's purse, mustard, water cress, field cress, dandelions.

Other edible products: Maple syrup, maple sugar, oxalis for pies, many kinds of mushrooms, wild rice, chicory, artichoke, groundnut.

Dyes have been obtained from: Walnut, sumach, indigo, madder, oak, puccoon, alder and others.

Christmas greens are furnished by our pines, cedars, etc., for trees, and holly, mistletoe, ground pine, and others for minor uses.

Other decorative materials are birch bark, bitter sweet canes, buckeyes, grasses, smilax, seaweeds.

Miscellaneous products: Tar, wood pulp, pine leaf fibre, excelsior, the various resins, gums, etc.; whistles from chestnut, willow, hickory, etc.; elder pop-guns, teasel, puff ball sponges, tanbark, hops, sphagnum moss and eel-grass for packing, punk, cattail fur, and wax from wax myrtle berries.

The following *official medicinal plants* grow wild in this State, besides many popular remedies: Grindelia, fennel, lady slipper, slippery elm, wahoo, thoroughwort, geranium, black mustard, white mustard, wintergreen, witch hazel, Canadian hemp, pleurisy root, black haw, calamus, caulophyllum, worm-seed, pipsissiwa, black snake root, blood root, prickly ash, elder, dock, dewberry, blackberry, poison ivy, sumach, hydrastis, blue flag, burdock, raspberry, podophylum, poke, pennyroyal, erigeron, sweet birch, Culver's root, lobelia, hops, horehound, yellow parilla, peppermint, spearmint, sassafras, scutellaria, senega, dutchman's pipe, pink root, jimson weed, tansy, dandelion, horse mint, bearberry, hellebore, white oak and wild cherry.

Books are not necessary, but one or more of the following would be helpful.

Coulter, "Plant Relations," D. Appleton & Co., New York.

Bergen, "Foundations of Botany," Ginn & Co., Boston.

Leavitt, "Outlines of Botany," American Book Co., New York.

Bailey, "Talks Afield," Houghton, Mifflin Co., Boston.

McDougal, "Elementary Plant Physiology," Longmans, Green Co., New York.

Andrews, "Botany all the Year Around," American Book Co., New York.

Masters, "Plant Life on the Farm," Orange Judd Co., New York.

Bailey, "First Lessons With Plants," Macmillan Co., New York (for young children).

The writer will be glad to give further assistance to anyone who wishes to take up studies suggested by the above outline.